

Making sense of data

Foundation Level FSMQ

Starters
<p>Coffee Shop Table of information about customers at a coffee shop. Use on paper or in spreadsheet form for discussion and practice of statistical techniques. Contributed by Janet Turner from Northampton College.</p>
<p>Draw line graphs in Excel Activity that shows students how to draw line graphs in Excel. Teacher notes included.</p>
<p>Draw pie charts in Excel Activity that shows students how to draw a pie chart in Excel and change its appearance. Teacher notes included.</p>
<p>Holiday Money Examples, exercise and experiments including currency exchange and many other topics involving direct proportionality. Teacher Notes included.</p>
<p>Pie Charts Activity that shows students how to draw a pie chart by hand. Also includes practice exercise with real data – this can also be used as follow up to ‘Draw pie charts in Excel’ activity. Teacher notes included.</p>
Assignments
<p>Body Mass Index Illustrates how work from GNVQ Intermediate Science may be adapted for Making sense of data. Involves collecting and illustrating data using a spreadsheet. Contributed by Margaret Pickersgill from Bradford College.</p>
<p>Circles Students measure circular objects and find p from the gradient of a graph. Contributed by Alison Brittle from Hopwood Hall College.</p>
<p>Computer Survey Students design a questionnaire about computer usage, carry out a survey and analyse the results. Contributed by Gill Read from Aldersley High School.</p>
<p>Map Distances Students compare distances found from a table and map, then plot a scatter graph to find the relationship. Contributed by Alison Brittle from Hopwood Hall College.</p>
<p>Melting and Freezing Points Illustrates how work from GNVQ Intermediate Science may be adapted for Making sense of data. Contributed by Margaret Pickersgill from Bradford College.</p>
<p>Mineral Water Contains tabulated data and charts about the mineral content of various bottled waters. Students are asked to interpret and analyse this information. Contributed by Margaret Pickersgill from Bradford College.</p>
<p>Pay Survey This assignment involves an investigation into how much paid work students do. Contributed by Alison Brittle from Hopwood Hall College.</p>
<p>Heights and Weights Data set of girls’ and boys’ heights and weights from which students select data, then calculate statistical measures and draw statistical diagrams. Contributed by Joseph Chamberlain Sixth Form College.</p>
Skill Activities
<p>Acid Rain Worksheet explains how acid rain is produced and requires students to analyse the data given in the accompanying spreadsheet.</p>
<p>Climate Excel spreadsheet containing sunshine, rainfall and temperature data for England and Wales, Northern Ireland and Scotland for each month in each year since 1961.</p>
<p>College Trip Includes a distance-time graph for interpretation. Contributed by Margaret Pickersgill from Bradford College.</p>
<p>Crushed Calcium Carbonate Includes data and line graph of a chemical reaction for interpretation. Contributed by Margaret Pickersgill from Bradford College.</p>
<p>Curves Discussion sheets and exercise on interpreting and sketching line graphs. Focuses on the shape of graphs. Teacher Notes included.</p>

<p>Eclipse Data sheets about eclipses, discussion sheet and exercise involving interpretation of statistical diagrams. Teacher Notes included.</p>
<p>Line Graphs Examples and exercises on conversion graphs (for direct proportionality) and other linear graphs. One question in each exercise requires use of a spreadsheet. Contributed by Alison Brittle from Hopwood Hall College</p>
<p>On Average Examples and exercises on mean, mode and median. Contributed by Alison Brittle from Hopwood Hall College.</p>
<p>Reaction Rates Drawing and interpreting graphs using data provided from chemical reactions. Requires graphs to be drawn using a spreadsheet as well as by hand. Teacher notes included.</p>
<p>Safety on the Roads Graphs and charts for interpretation. Teacher Notes included.</p>
<p>Election Results Spreadsheet containing the 2001 and 2005 General Election Results. Select local data for your students to use to practise drawing charts, finding % etc.</p>
<p>Graphs 12 pairs of cards for students to match. One card in each pair shows a graph and the other gives a description of the real situation that the graph represents. Powerpoint presentation to aid discussion (shows the same graphs with titles and labels added). Teacher Notes included.</p>
<p>Ratio Bingo & Matching Cards (skills activity) Activities that give learners practice in simplifying ratios. Teacher Notes included.</p>
<p>Fractions, Decimals and % (skills activity) Series of worksheets for practice in converting between fractions, decimals and percentages. Includes Teacher Notes with weblinks to useful internet resources.</p>
<p><i>Other Resources</i></p>
<p>Making Sense of Data Work Scheme A suggested work scheme for this unit. Includes a list of topics to be covered, information about resources that can be used and suggested time allocations.</p>
<p>Managing Money and Making Sense of Data Work Scheme A suggested work scheme for combining these two units. Contributed by St. Vincent College.</p>
<p>Making Sense of Data Revision Guide</p>
<p>Weblinks Addresses of websites where useful information can be found.</p>

Managing Money

Starters
Best Buys Examples and worksheet. Teacher notes included.
Assignments
Bank Statement Students create a spreadsheet to show income and expenditure over two months then analyse the information using graphs, charts and statistical measures. Contributed by Jenny Robinson from Highlands College.
Bills (+ separate Teacher Notes) Simulated water, electricity and gas bills, exercise and sample examination questions based on these bills and an assignment. Exercise involves checking calculations and using an Excel spreadsheet.
Car Costs (+ separate Teacher Notes) Assignment and sample examination questions supported by three data sheets. Assignment requires students to use a spreadsheet to keep an account of the cost of running a car.
Earning Interest Students use information from the internet to investigate the interest earned on an inheritance in different savings accounts. Optional use of spreadsheet. Contributed by Jenny Robinson from Highlands College.
Have a Holiday (+ separate Teacher Notes) Data sheet giving information about holiday costs, an assignment and sample examination questions based on this sheet. Optional use of Excel spreadsheet.
Invoice assignment Students use an Excel spreadsheet and explain and check calculations on bills or invoices. Contributed by Alison Brittle from Hopwood Hall College.
Party Time Students use on-line shopping to find best buys and cost a party. Optional use of spreadsheet. Contributed by Jenny Robinson from Highlands College.
Best Buy Assignment with structured section on best buys followed by an extension that gives students the opportunity of working independently. Contributed by Joseph Chamberlain Sixth Form College.
Ordering from a Catalogue Students choose furniture for a bedroom and complete an order form. Also includes use of a scale diagram to cover some of the other portfolio requirements for Application of Number at Level 1. Contributed by Joseph Chamberlain Sixth Form College.
Skill Activities
Find % Find % without a calculator and on a spreadsheet.
Firefighters' Pay (+ separate Teacher Notes) Students compare rises of 11%, 16% and 40% in the annual pay of 4 different ranks of firefighters and the difference this might make to a fireman's savings. Answers in a separate Teacher Notes file. Contributed by Joan Ridgway from Exeter College.
Interest Rates Includes a table of interest rates. Students compare compound and simple interest. Contributed by Joan Ridgway from Exeter College.
Sale Students use a spreadsheet to work out sale prices and check their results. Teacher Notes included.
Student Budget (+ separate Answers and Teacher Notes) A spreadsheet showing a student's bank balance over a term and a worksheet based on it. Answers and Teacher Notes in separate files. Contributed by Joan Ridgway from Exeter College.
VAT Find VAT without a calculator and on a spreadsheet. Teacher Notes included.
Which mobile phone tariff? Students enter values onto an Excel spreadsheet, explain calculations then choose the most suitable tariff. Contributed by Alison Brittle from Hopwood Hall College.
Checking Methods Bills to check using a range of methods. Contributed by Alison Brittle from Hopwood Hall College.
Invoice Calculations Calculations for students to complete & check. Contributed by Alison Brittle from Hopwood Hall College.
Electricity Bill Table giving information and a bill to check. Contributed by Alison Brittle from Hopwood Hall College.

<p>Percentages Powerpoint presentation shows the relationship between fractions, decimals and percentages. Worksheet and spreadsheet give practice with percentages in contexts involving money. Teacher Notes included.</p>
<p>Calculating VAT Worksheet to give students practice with working out 5% VAT on fuel bills. Contributed by Sandra Westlake & Jackie Walker from Kingsbridge Community College.</p>
<p>Create a Bank Statement Sheet of transactions to put in order to create a bank statement. Contributed by Sandra Westlake & Jackie Walker from Kingsbridge Community College.</p>
<p>Overtime For giving students practice in using a spreadsheet to work out overtime rates. Contributed by Sandra Westlake & Jackie Walker from Kingsbridge Community College.</p>
<p>Savings & Interest Worksheet to give students practice with working out interest and amounts in accounts after 1 year. Contributed by Sandra Westlake & Jackie Walker from Kingsbridge Community College.</p>
<p>Simple and Compound Interest Spreadsheet gives examples and practice for students. Answers provided in a separate spreadsheet. Contributed by Su Nicholson from Loreto College.</p>
<p>Simple and Compound Interest Spreadsheet gives examples and practice for students. Answers provided in a separate spreadsheet. Contributed by Su Nicholson from Loreto College.</p>
<p>Bank Balance Game in which learners enter items onto bank balance statements and calculate the resulting balances.</p>
<p>Spot the Errors An invoice, phone bill and bank statement for learners to check (several errors on each). Also provided with spaces for students to complete. Teacher Notes list the errors and give the correct answers.</p>
<p>Ratio Bingo & Matching Cards (skills activity) Activities that give learners practice in simplifying ratios. Teacher Notes included.</p>
<p>Fractions, Decimals and % (skills activity) Series of worksheets for practice in converting between fractions, decimals and percentages. Includes Teacher Notes with weblinks to useful internet resources.</p>
<p><i>Other Resources</i></p>
<p>Managing Money Work Scheme A suggested work scheme for this unit. Includes a list of topics to be covered, information about resources that can be used and suggested time allocations.</p>
<p>Managing Money and Making Sense of Data Work Scheme A suggested work scheme for combining these two units. Contributed by St. Vincent College.</p>
<p>Managing Money Revision Guide</p>
<p>Weblinks Addresses of websites where useful information can be found.</p>

Working in 2 and 3 dimensions

Starters
Angles Powerpoint presentation and activity measuring and classifying angles. Teacher notes included.
Arranging the Furniture Students measure furniture, consider different arrangements and draw a scaled plan. Teacher notes included.
Drawing Shapes in Word Activity that shows students some of the basic drawing techniques that are available in Word. Teacher notes included.
Name the Shape Powerpoint presentation and activity naming and classifying shapes. Teacher notes included.
What is it? Introduces the representation of objects by plans and elevations. Only available in pdf format because of the memory required for photographs in Word. Separate Teacher Notes
Perimeter and Area Powerpoint presentation, information sheet and worksheet covering the perimeter and area of rectangles and shapes made from rectangles. Teacher Notes included.
Measure It! Powerpoint presentation to demonstrate and check that students can measure in centimetres and millimetres. Worksheet for recording measurements. Teacher Notes included.
Assignments
Geometric Design Students use geometrical terms and ideas to describe designs then use constructions to create a design of their own. (Can be split into separate assignments.) Teacher Notes included.
Wheelchair Access Students assess a computer room for wheelchair access and re-design the work area to make it easy for a disabled person to use. Contributed by Gill Read from Aldersley High School.
Skill Activities
Crop Circles After sketching and describing crop circles found on a website, students construct a geometrical design, describe its symmetries then produce their own designs. Teacher notes included.
How much will it cost? Students take measurements from scaled elevations of a house to find the wall area to be painted and then work out the cost. Teacher notes included. (N.B. 'Costing the Job' is a more difficult version.)
Make your own shapes in Word Activity that shows students how to draw their own shapes in Word, with and without gridlines. Teacher notes included.
Plans Choose from 7 plans with scales of varying difficulty. Teacher Notes included.
Stained Glass Stained glass sun catchers for students to describe and design. Teacher Notes included.
Symmetry in Word Students use the Rotate and Flip options in Word to draw symmetrical figures. Teacher notes included.
Tessellation Shapes Collection of shapes to print on card and laminate.
Tessellations in Word Activity that shows students how to draw tessellations in Word, with and without gridlines. Teacher notes included.
Convert Lengths Bingo and dominoes games to provide practice in converting lengths. Teacher notes included.
Volume Powerpoint presentation, information sheets and worksheet on the volume of cuboids. Teacher Notes included.

<i>Other Resources</i>
Working in 2 and 3 Dimensions Work Scheme A suggested work scheme for this unit. Includes a list of topics to be covered, information about resources that can be used and suggested time allocations.
Working in 2 & 3 Dimensions Revision Guide
Weblinks Addresses of websites where useful information can be found.

Calculating finances

Intermediate Level FSMQ

Starters
Payslips Data sheets including three simulated pay slips and related worksheet. Teacher Notes included.
Assignments
Saving (+ separate Teacher Notes) Leaflet giving interest rates on three instant access savings accounts, exercise and sample examination questions based on the leaflet and an assignment. Exercise uses Excel spreadsheet.
Skill Activities
Income Tax Notes, examples and exercises based on rates for the current tax year. Contributed by Kingston College.
Interest on Savings Notes, examples and exercises involving simple and compound interest. Comparison of different types of savings. Contributed by Kingston College.
Keeping an Account Notes, example and exercise. Contributed by Kingston College.
Long Term Personal Loans Notes, examples and exercise. Contributed by Kingston College.
Mortgages Notes, examples and exercise. Contributed by Kingston College.
National Insurance Notes, examples and exercise based on rates for the current tax year. Contributed by Kingston College.
Short Term Personal Loans Notes, examples and exercise. Requires information from building society or bank leaflets. Contributed by Kingston College.
Credit Cards Notes and example including spreadsheet formulae. Contributed by Kingston College.
Insurance Rates Students investigate the link between crime figures and the cost of vehicle and home insurance. Teacher Notes included.
Simple and Compound Interest Spreadsheet gives examples and practice for students. Answers provided in a separate spreadsheet. Contributed by Su Nicholson from Loreto College.
Ratio Bingo & Matching Cards (skills activity) Activities that give learners practice in simplifying ratios. Teacher Notes included.
Other Resources
Calculating Finances Work Scheme A suggested work scheme for this unit. Includes a list of topics to be covered, information about resources that can be used and suggested time allocations.
Weblinks Addresses of websites where useful information can be found.

Handling and interpreting data

Starters
Draw line graphs in Excel Activity that shows students how to draw line graphs in Excel. Teacher notes included.
Draw pie charts in Excel Activity that shows students how to draw a pie chart in Excel and change its appearance. Teacher notes included.
Pie Charts Activity that shows students how to draw a pie chart by hand. Also includes practice exercise with real data – this can also be used as follow up to ‘Draw pie charts in Excel’ activity. Teacher notes included.
Solar Eclipse Lots of data for discussion and suggestions for analysis. Optional use of spreadsheet. Teacher Notes included.
Sports Questionnaires Set of 50 responses in questionnaire form and as a spreadsheet. Separate Teacher Notes include short exercises giving practice in statistical techniques.
Assignments
Global Warming Gives a list of websites that have reports or articles about global warming including statistical evidence. Students analyse one of these reports to meet the second portfolio requirement. Includes Teacher Notes.
Heart Rate Assignment in which students are told how to measure heart rate and then asked to plan and carry out an investigation. Includes Teacher Notes.
Larks and Owls Assignment in which students carry out an investigation involving sleep. Includes Teacher Notes.
Crime in the Regions Assignment in which students compare crime figures for their region with other regions. Includes Teacher Notes.
5 a day An investigation to find out to what extent people understand and follow government advice to eat 5 portions of fruit and vegetables per day. Includes Teacher Notes.
Skill Activities
A Risky Business Data Sheet involving accidents in the home and at work and leisure, probability worksheet and Teacher Notes including answers. Spreadsheet containing the same data.
Athletics Excel spreadsheet contains large datasets of track and field events. Separate Teacher Notes give suggestions for their use.
Box and Whisker Plots Students can use this Excel spreadsheet to draw up to 4 box and whisker plots. Includes instructions. Contributed by Lindy McGuinness of Braintree College.
Climate Excel spreadsheet containing sunshine, rainfall and temperature data for England and Wales, Northern Ireland and Scotland for each month in each year since 1961.
Datasets Data concerning road accidents, causes of mortality, marriage, divorce and food consumption in an Excel spreadsheet.
Histogram Instructions explaining how to construct an accurate histogram and frequency polygon in Excel Contributed by Lindy McGuinness of Braintree College.
Interpreting Curves Discussion sheets and exercise on interpreting and sketching line graphs. Focuses on the shape of graphs. Teacher Notes included.
Safety on the Roads Graphs and charts for interpretation. Teacher Notes included.
Election Results Spreadsheet containing the 2001 and 2005 General Election Results. Select data for your students to use to practise drawing charts, finding % etc.

Cumulative frequency graphs in Excel Activity that shows students how to draw a cumulative frequency graph in Excel. Teacher notes included.
Applying for HE Data Sheets and spreadsheet giving gender, age, ethnic origin and other information about HE applicants. Worksheet and Teacher Notes suggest uses.
<i>Other Resources</i>
Handling and Interpreting Data Work Scheme A suggested work scheme for this unit. Includes a list of topics to be covered, information about resources that can be used and suggested time allocations.
Weblinks Addresses of websites where useful information can be found.

Making connections in mathematics

Intermediate Level FSMQ

<i>Starters</i>
<p>Drawing Shapes in Word Activity that shows students some of the basic drawing techniques that are available in Word. Teacher notes included.</p>
<p>Foreign Currency Examples, exercise and experiments including currency exchange and many other topics involving direct proportionality. Teacher Notes included.</p>
<p>Graphs of Functions in Excel This activity shows students how to draw graphs of algebraic functions in Excel. Teacher Notes included.</p>
<i>Assignments</i>
<p>Two at a Time A number investigation that can be used to generate evidence for the third portfolio requirement. Teacher Notes included.</p>
<i>Skill Activities</i>
<p>Angles and polygons Powerpoint presentation covering angle and polygon properties. Can be split into parts to use in introductions to topics or used as a whole for revision.</p>
<p>Area and Algebra Student worksheets using areas to carry out multiplication of numbers and algebraic terms. Teacher Notes included.</p>
<p>Linear Graphs This activity uses an interactive spreadsheet to introduce the shape and main features of proportional and linear graphs. Teacher Notes included.</p>
<p>Make your own shapes in Word Activity that shows students how to draw their own shapes in Word, with and without gridlines. Teacher notes included.</p>
<p>Number Investigations Four ideas for number investigations. Contributed by Janice King from Worthing Sixth Form College.</p>
<p>Proportion List of ideas for practical and non-practical work. . Contributed by Janice King from Worthing Sixth Form College.</p>
<p>Tessellation Shapes Collection of shapes to print on card and laminate.</p>
<p>Tessellations in Word Activity that shows students how to draw tessellations in Word, with and without gridlines. Teacher notes included.</p>
<i>Other Resources</i>
<p>Making Connections in Mathematics Work Scheme A suggested work scheme for this unit. Includes a list of topics to be covered, information about resources that can be used and suggested time allocations.</p>
<p>Weblinks Addresses of websites where useful information can be found.</p>

Solving problems in shape and space

Intermediate Level FSMQ

Starters
<p>Drawing Shapes in Word Activity that shows students some of the basic drawing techniques that are available in Word. Teacher notes included.</p>
<p>Points of View Introduces the representation of objects by plans and elevations. Only available in pdf format because of the memory required for photographs in Word. Includes use of dotted line for hidden edges. Separate Teacher Notes</p>
Assignments
<p>Shape Sorter Students design a shape sorter, using scale drawings, plans, elevations and geometrical terms. Teacher notes included.</p>
Skill Activities
<p>Costing the Job Students take measurements from scaled elevations of a house to find the wall area to be painted and then work out the cost. Teacher notes included. (N.B. 'How much will it cost?' is an easier version.)</p>
<p>Crop Circle Geometry After sketching and describing crop circles found on websites, students construct a geometrical design, describe symmetries and transformations then produce their own designs. Teacher notes included.</p>
<p>Errors Powerpoint presentation showing errors in measurements and how errors accumulate in calculations involving measurements. Accompanying notes and worksheets. Teacher notes included.</p>
<p>Make your own shapes in Word Activity that shows students how to draw their own shapes in Word, with and without gridlines. Teacher notes included.</p>
<p>Pentagon Instructions for constructing a regular pentagon. Can be used as an extension to Crop Circle Geometry.</p>
<p>Pythagoras Powerpoint presentation, notes and worksheet. Teacher Notes included with links to useful websites..</p>
<p>Suncatchers Stained glass suncatchers for students to describe and design. Teacher Notes included.</p>
<p>Symmetry in Word Students use the Rotate and Flip options in Word to draw figures with line and rotational symmetry. Teacher notes included.</p>
<p>Tessellation Shapes Collection of shapes to print on card and laminate.</p>
<p>Tessellations in Word Activity that shows students how to draw tessellations in Word, with and without gridlines. Teacher notes included.</p>
<p>Victorian Tiles Students look for geometrical shapes and symmetry in encaustic tile patterns then design a tessellation using geometrical shapes themselves. Teacher Notes included.</p>
Other Resources
<p>Solving Problems in Shape and Space Work Scheme A suggested work scheme for this unit. Includes a list of topics to be covered, information about resources that can be used and suggested time allocations.</p>
<p>Weblinks Addresses of websites where useful information can be found.</p>

Using algebra, functions and graphs

Starters
Graphs of Functions in Excel This activity shows students how to draw graphs of algebraic functions in Excel. Teacher Notes included.
Hire a Coach Uses Excel in real contexts to introduce the concepts of gradient and intercept for linear graphs. Teacher Notes included.
Linear Graphs Powerpoint presentation and activity to introduce linear graphs. Teacher Notes included.
Plumbers' Prices An introduction to the graphical solution of simultaneous equations using Excel in real contexts. Can be used as a follow-up to Hire a Coach. Teacher Notes included.
Road Test Includes data from a road test on a sports car. Use at the start of the course for practice in drawing and interpreting graphs. Optional use of spreadsheet. Teacher Notes included.
Area under a graph Powerpoint presentation to introduce area under a velocity-time graph accompanied by examples for students to try. Optional use of spreadsheet/graphic calculator. Teacher Notes including answers.
Large and Small Powerpoint presentation and examples from real contexts to introduce, practise or revise standard form. Teacher Notes including answers.
Assignments
Boyle's Law (+ separate Teacher Notes) Data sheet giving pressure and volume of a fixed mass of gas, an assignment and sample examination question based on this experimental data.
Circuit Boards Students investigate the cost efficiency of two machines using graphical and algebraic techniques. Includes a guidance sheet. Contributed by Kingston College.
Shoot Students investigate the distance travelled by an object rolling down an inclined plane using graphical and algebraic techniques. Includes a guidance sheet. Contributed by Kingston College.
Skill Activities
Experiments List of seven experiments that generate linear and non-linear data. Students are asked to find appropriate algebraic models. Contributed by Nova Brookes from Worthing Sixth Form College.
Formulae Powerpoint presentation, notes and exercise including a range of formulae involving areas and volumes, interest calculations, temperature conversion and equations of motion. Teacher Notes included.
Linear Relationships Example and exercise involving proportionality and other linear relationships in scientific contexts. Contributed by Kingston College.
Road Test Data Includes data from a road test on a sports car. Worksheet giving practice in fitting linear and quadratic functions. Optional use of spreadsheet. Teacher Notes included.
Spreadsheet Graphs This activity uses interactive spreadsheet graphs to introduce the shape and main features of proportional, linear, inverse proportional and quadratic graphs. Teacher Notes included.
The Quadratic Formula Two examples introducing the quadratic formula and set of similar equations to solve. Teacher Notes included.
Tunnel Students solve a problem involving a road tunnel by finding solutions of quadratic equations using a graph drawn in Excel and then using the quadratic formula. Includes a range of other problems and Teacher Notes.
Factor Cards Nearly 100 pairs of cards showing a wide variety of quadratic expressions and their factors. Use in a pairing activity to give students practice in expanding brackets or factorising. Teacher Notes included.

Quadratic Graphs Powerpoint presentation, notes and exercise on drawing quadratic graphs and using them to solve equations. Teacher Notes included.
Match linear functions and graphs 12 sets of cards, each containing a linear graph, its equation and the real situation it represents – for students to match. Teacher Notes included.
Rearrange Formulae A wide range of formulae from real contexts (areas, volumes, interest calculations, temperature conversion, equations of motion etc) for students to rearrange. Teacher Notes include answers and cards that can be used to help students with the most difficult cases.
<i>Other Resources</i>
Using Algebra, Functions and Graphs Work Scheme A suggested work scheme for this unit. Includes a list of topics to be covered, information about resources that can be used and suggested time allocations.
Weblinks Addresses of websites where useful information can be found.

Working with algebraic & graphical techniques

Advanced Level FSMQ

Starters
<p>Graphic Calculators Powerpoint presentation that introduces students to the Casio fx-7400G PLUS calculator. Contributed by Richard Tarry of Tower Hamlets College.</p>
<p>Graphs of Functions in Excel This activity shows students how to draw graphs of algebraic functions in Excel. Teacher Notes included.</p>
<p>Interactive Graphs This activity uses interactive spreadsheet graphs to introduce the shape and main features of proportional, linear, quadratic and power graphs. Teacher Notes included.</p>
<p>Linear Graphs Powerpoint presentation and activity to introduce linear graphs. Teacher Notes included.</p>
<p>Log Graphs Examples (involving earthquakes and planetary motion) that can be used to introduce log graphs. Ideas of experiments and other situations that can be used for portfolio work. Teacher Notes included.</p>
<p>Growth and Decay Powerpoint presentation that uses compound interest and radioactive decay to introduce exponential growth and decay.</p>
Assignments
<p>Coughs and Sneezes Includes data about the way in which an outbreak of the common cold spreads. Students are asked to model the data using trigonometric and polynomial functions. Teacher notes included.</p>
<p>Cup of Coffee A Data Sheet gives the amount of caffeine remaining in the bodies of a group of people at intervals of 1 hour after they have drunk a cup of coffee or cola. Students are asked to model the data using exponential and linear functions. Teacher notes included.</p>
<p>SARS A and B SARS A gives the number of deaths from SARS in 2003. Students choose, draw and evaluate functions to model the data. Teacher notes show which parts of the portfolio requirements are covered. SARS B is an alternative version of the assignment contributed by Alan Heslington of Tyne Metropolitan College</p>
<p>Sea Defence Wall Two versions of an assignment in which students find functions to model the outline of a sea defence wall. The first version encourages students to work independently, the second is more structured for less able students. Contributed by Ann Clarke from Cambridge Regional College.</p>
<p>Smoke Strata (+ separate Teacher Notes) Includes data about the height of smoke layers due to a fire in a tall building and sample examination question. Data could also be used to give practice for portfolio requirements or form the basis for an assignment.</p>
<p>Sunrise & Sunset Times Students find and evaluate trigonometric functions to model how the amount of daylight varies with the day of the year. Includes data for Adelaide, Brisbane and London. Contributed by Kingston College School of Mathematics.</p>
<p>Tides Data set giving the water depth each hour during a day. Students choose, draw and evaluate functions to model the data. Teacher notes and a range of possible solutions included.</p>
<p>Water Flow (+ separate Teacher Notes) Includes data about the velocity of water as it flows along an open channel and sample examination question. Data could also be used to give practice for portfolio requirements or form the basis for an assignment.</p>

<i>Skill Activities</i>
Broadband A Instructions showing how to use Excel to find a quadratic model for the growth in broadband connections in recent years. Teacher Notes included.
Broadband B Instructions showing how to use a graphic calculator to find a quadratic model for the growth in broadband connections in recent years. Teacher Notes included.
Broadband C Instructions and Powerpoint presentation showing how to use algebra to find a quadratic model for the growth in broadband connections in recent years. Teacher Notes included.
Climate A Students use an Excel spreadsheet to find polynomial functions to model temperature change and compare with an exponential model. Can be used alone or with Climate B. Teacher notes included.
Climate B Students use a graphic calculator to find a polynomial function to model temperature change and compare with an exponential model. Can be used alone or with Climate A. Teacher notes included.
Test Run Students interpret a speed-time graph and fit both linear and quadratic models. The performance data is also given in an Excel spreadsheet for comparison with models. Teacher Notes included.
The Ozone Hole Data concerning depletion of ozone levels and the increase in the area of the Antarctic ozone hole over the last twenty years. Students investigate possible linear, quadratic and exponential models. Optional use of spreadsheet. Teacher Notes included.
Tin Can Students design a tin can, using algebraic and graphical techniques. Optional use of the internet. Contributed by Kingston College.
Using the CASIO fx-7400G PLUS Notes on how to use this calculator - includes how to draw the graph of a function, investigate how well a model fits data and how to find a model.
Max & Min Problems Powerpoint presentation and practice questions using a spreadsheet or graphic calculator to solve problems involving maximum and minimum values. Teacher notes included.
Factor Cards Nearly 100 pairs of cards showing a wide variety of quadratic expressions and their factors. Use in a pairing activity to give students practice in expanding brackets or factorising. Teacher Notes included.
Match linear functions and graphs 12 sets of cards, each containing a linear graph, its equation and the real situation it represents – for students to match. Teacher Notes included.
Completing the Square Powerpoint presentation shows how to complete the square and use this form to sketch graphs. Card-matching activity using a selection from 24 sets each of 3 cards showing a quadratic graph, the corresponding function and its completed square form. Teacher Notes included.
Simultaneous Equations on a graphic calculator Instructions for using the CASIO fx-7400G PLUS calculator to solve simultaneous equations.
Gas Guzzlers Powerpoint presentation and activity in which students use a log graph to find an exponential function to model real data. Teacher Notes included.
<i>Other Resources</i>
AS: Use of Mathematics Work Scheme A suggested work scheme for AS: Use of Mathematics. Includes a list of topics to be covered for the two compulsory units, information about resources that can be used and suggested time allocations.
Working with Algebraic and Graphical Techniques Work Scheme A suggested work scheme for this unit. Includes a list of topics to be covered, information about resources that can be used and suggested time allocations.
Weblinks Addresses of websites where useful information can be found.

Modelling with calculus

Advanced Level FSMQ

Starters
Area under a graph Introduction to integration using area under velocity-time graphs. Powerpoint presentation, notes and exercises. Teacher notes included.
Exponential Rates of Change Introduction to differentiation of exponential functions. Students draw tangents to curves, then investigate gradient functions using a spreadsheet. Teacher notes in separate file.
Gradients Powerpoint presentation introducing differentiation and a worksheet and Excel spreadsheet which students can use to calculate gradients from increments.. Teacher notes included.
Assignments
Containers Assignment in which students use differentiation to minimise surface area. Teacher notes included.
That's a Lot of Rock! Students fit a curve to the cross section of a tunnel, then use integration and numerical methods to estimate the volume of rock removed and the time taken. Contributed by Jane Turnbull from Woodkirk High School.
Maximum Volume/Minimum Materials Powerpoint presentation including worked examples for use in discussion with students about maximum and minimum problems they could investigate as part of their coursework portfolios. Contributed by Lindy McGuinness of Braintree College.
Skill Activities
Coastal Erosion A This activity uses the context of coastal erosion to introduce the trapezium rule for estimating the area under a curve. Can be combined with Coastal Erosion B. Teacher notes included.
Coastal Erosion B Students use integration to estimate loss of land due to coastal erosion. Can be combined with Coastal Erosion A. Teacher notes included.
Drug Clearance Data Sheet shows how drug clearance after taking a painkiller can be modelled by exponential decay. Students investigate further (including the clearance of caffeine after a variety of drinks). Teacher notes included.
Maxima and Minima Powerpoint presentation and practice questions using differentiation to solve maxima and minima problems. Teacher notes included.
Stationary Points Powerpoint presentation, examples and practice questions on sketching graphs. Teacher notes included.
What's it worth? Investigate a variety of suggested models for the depreciation of a car. Involves solving differential equations, drawing sketch graphs and comparison with real data. Teacher notes included.
Polynomial graphs and gradients 12 sets of cards, each consisting of a polynomial function, its graph, its gradient function and the graph of the gradient function – for students to match. Teacher Notes included.
Mean Values Students use area formulae and integration to find mean values of speed, share prices and water depth. Supported by Powerpoint presentation. Teacher Notes included.
Other Resources
Modelling with Calculus Work Scheme A suggested work scheme for this unit. Includes a list of topics to be covered, information about resources that can be used and suggested time allocations.
Weblinks Addresses of websites where useful information can be found.

Using and applying statistics

Advanced Level FSMQ

Starters
Draw line graphs in Excel Activity that shows students how to draw line graphs in Excel. Teacher notes included.
Draw pie charts in Excel Activity that shows students how to draw a pie chart in Excel and change its appearance. Teacher notes included.
Graphic Calculators Powerpoint presentation that introduces students to the Casio fx-7400G PLUS calculator. Contributed by Richard Tarry of Tower Hamlets College.
Music Worksheet which requires students to write an hypothesis and design an experiment to test whether listening to music has any effect on the performance of people doing work. Also includes arithmetic tests that may be used to carry out such an experiment. Teacher Notes included.
Pie Charts Activity that shows students how to draw a pie chart by hand. Also includes practice exercise with real data – this can also be used as follow up to ‘Draw pie charts in Excel’ activity. Teacher notes included.
Price at the Pump Discuss what factors affect petrol prices at different petrol stations and how you could collect data to investigate the ideas generated. May also be used later in the course when students are able to analyse data they collect. Teacher Notes included. Contributed by Alex Marsh of Philip Harris Education.
Results Data sheets containing A level results and a worksheet with related statements. Students consider the limitations of the data in assessing the truth of the statements. Optional use of spreadsheet. Teacher Notes included.
Stature Data sheet gives the heights of samples of men and women from 8 countries. Student worksheet leads to main features of samples from normal distributions. Optional use of spreadsheet. Teacher Notes included.
Sampling Powerpoint presentation, activity, information sheet and work sheet including finding random and representative samples, questionnaire design etc. Teacher Notes included.
HE Applications Data Sheets and spreadsheet giving gender, age, ethnic origin and other information about HE applicants. Worksheet and Teacher Notes suggest uses.
Assignments
Anthropometric Data Excel Spreadsheet contains anthropometric data from a large sample of children and young adults. Teacher notes give suggestions for their use in an assignment or for practice of statistical techniques.
Global Warming Gives a list of websites that have reports or articles about global warming including statistical evidence. Students analyse one or more of these reports to meet the second portfolio requirement. Includes Teacher Notes.
Mammals Data sheets giving body mass, brain mass, sleep duration, life span, gestation time and danger index for small, medium and large mammals. Assignment based on the data and suggestions for alternative uses. Optional use of spreadsheet. Teacher Notes included.
Critical Thinking Gives general instructions for the report that learners must include in their portfolio and a list of useful weblinks. Teacher Notes included.

<i>Skill Activities</i>
Athletics Excel spreadsheet contains large datasets of track and field events. Separate Teacher Notes give suggestions for their use.
Box and Whisker Plots Students can use this Excel spreadsheet to draw up to 4 box and whisker plots. Includes instructions. Contributed by Lindy McGuinness of Braintree College.
Casio Calculators Instructions for using a Casio fx83WA or fx85WA to find the mean, standard deviation, product moment correlation coefficient and regression line of y on x . Contributed by Kingston College.
Climate Excel spreadsheet containing sunshine, rainfall and temperature data for England and Wales, Northern Ireland and Scotland for each month in each year since 1961.
Correlation Students find product moment correlation coefficients and draw scatter graphs. Contributed by Anne Mullice of St. Vincent College.
Datasets Data concerning road accidents, causes of mortality, marriage, divorce and food consumption in an Excel spreadsheet.
DISCUSS Correlation & Regression Simulations to aid understanding of correlation and regression. Internet access needed. Teacher Notes included.
DISCUSS Sampling Simulations to aid understanding of how variation occurs within and between samples. Internet access needed. Teacher Notes included.
Health Data Data sets involving the health of adults and children in the UK and information about hospital waiting lists etc.
Histogram Instructions explaining how to construct an accurate histogram and frequency polygon in Excel Contributed by Lindy McGuinness of Braintree College.
Indicators of Child Well-being Excel spreadsheet contains indicators of individual and social well-being of children in various countries. Separate Teacher Notes give suggestions for their use.
Module Results Students analyse and compare results for two modules. Includes use of Excel and Autograph as well as diagrams and calculations done by hand. Contributed by Anne Mullice of St. Vincent College.
Pareto Charts Combination of bar and cumulative frequency charts that are useful in economics, business and management. Data sheet and worksheet. Teacher Notes included
Subjects Spreadsheet containing recent A level results in 13 subjects. Use for practice of spreadsheet skills or in an assignment.
Trends Excel spreadsheet containing large sets of data concerning marriages, household expenditure and deaths.
Pulse Rates Experiment to find the effect of exercise on pulse rates. Spreadsheet gives results from such an experiment carried out over a number of years by Dr Richard Wilson at the University of Queensland. Teacher Notes included.
Election Results Spreadsheet containing the 2001 and 2005 General Election Results. Use for practice of spreadsheet skills or in an assignment.
Cumulative frequency graphs in Excel Activity that shows students how to draw a cumulative frequency graph in Excel. Teacher notes included.
<i>Other Resources</i>
Using and Applying Statistics Work Scheme A suggested work scheme for this unit. Includes a list of topics to be covered, information about resources that can be used and suggested time allocations.
Weblinks Addresses of websites where useful information can be found.

Using and applying decision mathematics

Advanced Level FSMQ

Starters
Networks Powerpoint presentation introducing networks and matrices and the associated terminology. Hand-outs and examples for students to try. Teacher notes included.
Critical Path Analysis Powerpoint presentation and activity to introduce critical path analysis. Teacher notes included.
Assignments
Sightseeing Tour Students plan the itinerary for a sightseeing tour in their local area. Teacher Notes included.
Skill Activities
Shortest Path Powerpoint presentation showing how to use Dijkstra's Algorithm. Hand-outs and practice questions for students. Teacher Notes included.
Cable TV Powerpoint presentation, data sheet and worksheets introducing and using Kruskal's and Prim's algorithms in real-life situations. Teacher Notes included.
College Open Day Two activities to introduce or revise the Chinese postman algorithm. Powerpoint presentation helps class discussion and demonstrates possible solutions. Teacher Notes included.
Other Resources
Using and Applying Decision Mathematics Work Scheme A suggested work scheme for this unit. Includes a list of topics to be covered, information about resources that can be used and suggested time allocations.
Weblinks Addresses of websites where useful information can be found.

Applying mathematics

Advanced Level FSMQ

Starters
Queues Use of random numbers to simulate the queue that builds up in a newsagent's shop. Teacher notes included.
Linear Inequalities Powerpoint presentation and activity introducing the graphical illustration of linear inequalities. Teacher Notes included.
Comprehensions
Advice Leaflets for students taking Applying Mathematics Paper 1 and Paper 2.
Mortality Article involving the historical development of the theory of mortality used by insurance companies and questions based on the article. Teacher notes included.
Power to the People Article explaining how electricity is distributed as alternating current using trigonometric functions to model the alternating voltages involved. Teacher notes included.
Presentation Marks Activity focusing on the 6 marks for presentation in Applying Mathematics Paper 1. Teacher notes included.
Skill Activities
Chaotic Population Students use a graphic calculator, then a spreadsheet, to investigate a recurrence relation which simulates population changes, some of which exhibit chaotic behaviour. Teacher Notes included.
Credit Card Debts Students use recurrence relations to work out how long it takes to pay off credit card debts. Includes the use of both a graphic calculator and spreadsheet. Teacher Notes included.
Linear Programming Powerpoint presentation and activity in which linear inequalities are used to solve problems in real contexts. Teacher Notes included.
Other Resources
AS: Use of Mathematics Work Scheme A suggested work scheme for AS: Use of Mathematics. Includes a list of topics to be covered for the two compulsory units, information about resources that can be used and suggested time allocations.
Weblinks Addresses of websites where useful information can be found.